CSAC Discussant
Jeff Lower

How could we improve or expand the measures that we are currently developing

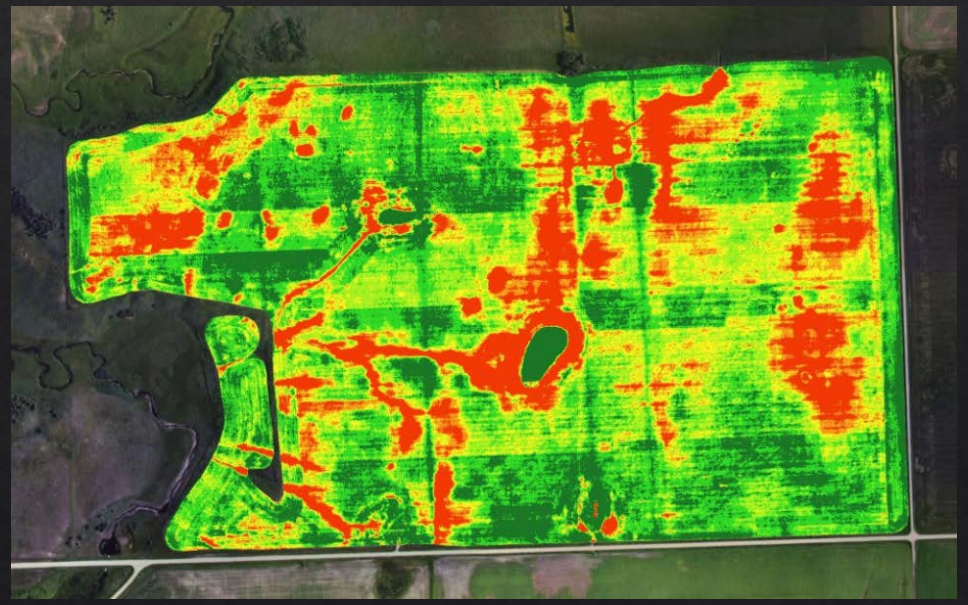
Potential improvement discussion items:

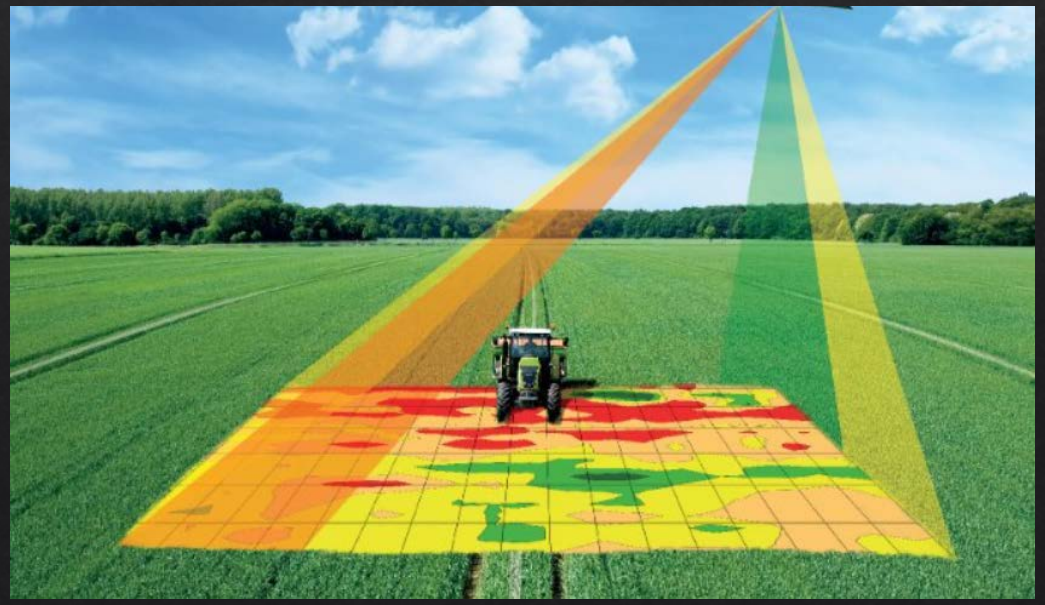
- **We are trying to measure doing more with less**
  - Manufacturing is easier to measure output vs. input, as compared with productivity of service related industries (example CADD/Engineering design).
  - The robot questions would be more relevant to manufacturing
  - What questions can we ask to determine productivity for service industry? We need to make a distinction between technology improvements like faster computers, more automated software, compared to improvements based on employee skill development.
  - Answers to some questions may be biased, as an owner of a company would want to answer to show their employees skill level is what differentiates them from other companies.

How could we improve or expand the measures that we are currently developing

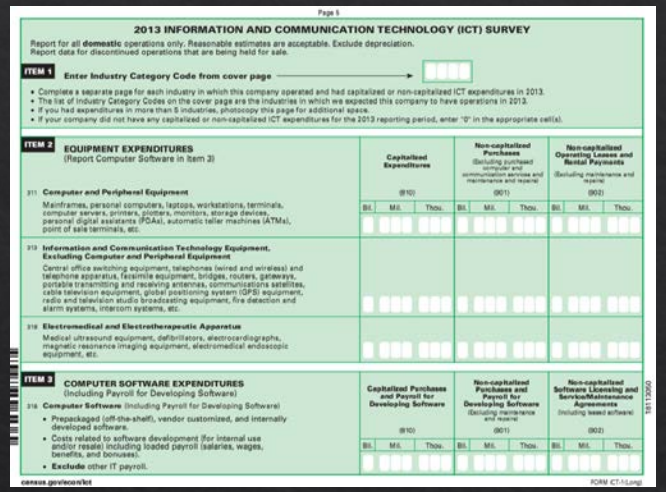
Potential expansion discussion items:

- Its interesting that this study and previous ones exclude Farms. The farming market has seen some of the highest degrees of technology integration over the last 20 years.
- Precision agriculture technology is widely used.
- I google'd technology adoption, 7 of the first 10 hits were agriculture related.





Would a modernized SMT or ICTS be viewed as a useful development, and what would you suggest these surveys cover?



2013 INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) SURVEY

Report for all **domestic** operations only. Reasonable estimates are acceptable. Exclude depreciation.
Report data for discontinued operations that are being held for sale.

ITEM 1 Enter Industry Category Code from cover page →

- Complete a separate page for each industry in which this company operated and had capitalized or non-capitalized ICT expenditures in 2013.
- The list of Industry Category Codes on the cover page are the industries in which we expected this company to have operations in 2013.
- If you had expenditures in more than 5 industries, photocopy this page for additional space.
- If your company did not have any capitalized or non-capitalized ICT expenditures for the 2013 reporting period, enter "0" in the appropriate cell(s).

ITEM 2 EQUIPMENT EXPENDITURES (Report Computer Software in Item 3)

	Capitalized Expenditures (810)	Non-capitalized Purchases (Excluding purchased computer and communication services and maintenance and repairs) (901)	Non-capitalized Operating Leases and Rental Payments (Excluding maintenance and repairs) (902)
311 Computer and Peripheral Equipment — Mainframes, personal computers, laptops, workstations, terminals, computer servers, printers, plotters, monitors, storage devices, personal digital assistants (PDAs), automatic teller machines (ATMs), point of sale terminals, etc.	Bil. Mil. Thou.	Bil. Mil. Thou.	Bil. Mil. Thou.
313 Information and Communication Technology Equipment, Excluding Computer and Peripheral Equipment — Central office switching equipment, telephones (wired and wireless) and telephone apparatus, facsimile equipment, bridges, routers, gateways, portable transmitting and receiving antennas, communications satellites, cable television equipment, global positioning system (GPS) equipment, radio and television studio broadcasting equipment, fire detection and alarm systems, intercom systems, etc.			
316 Electromedical and Electrotherapeutic Apparatus — Medical ultrasound equipment, defibrillators, electrocardiographs, magnetic resonance imaging equipment, electromedical endoscopic equipment, etc.			

ITEM 3 COMPUTER SOFTWARE EXPENDITURES (Including Payroll for Developing Software)

	Capitalized Purchases and Payroll for Developing Software (810)	Non-capitalized Purchases and Payroll for Developing Software (Excluding maintenance and repairs) (901)	Non-capitalized Software Licensing and Service/Maintenance Agreements (Including leased software) (902)
316 Computer Software (Including Payroll for Developing Software) — • Prepackaged (off-the-shelf), vendor customized, and internally developed software. • Costs related to software development (for internal use and/or resale) including loaded payroll (salaries, wages, benefits, and bonuses). • **Exclude** other IT payroll.	Bil. Mil. Thou.	Bil. Mil. Thou.	Bil. Mil. Thou.

census.gov/econ/ict — FORM CT-1(Long) — 18112000

Yes, I think a modernized SMT or ICTS would be useful.

- SMT seemed to be geared toward manufacturing, and ICTS was focused on cap-ex and non cap-ex expenditures by industry
- Need more focus on correlation to production and productivity
- Its more difficult to measure, but need more focus on Service sector, and maybe add farming?

Nominal GDP sector composition, 2015 (in percentage and in millions of dollars):[1]

№	Country/Economy	Total GDP (US$MM)	Agri.	Indus.	Serv.	Agri.	Indus.	Serv.
–	**World**	**75,212,696**	**5.9%**	**30.5%**	**63.6%**	**4,437,549**	**22,939,872**	**47,835,275**
1	United States	17,946,996	1.12%	19.1%	79.7%	215,364	3,427,876	14,303,756
2	China	12,218,281	6.9%	40.1%	52.9%	843,061	4,899,531	6,463,471
3	Japan	4,730,300	1.2%	27.5%	71.4%	56,764	1,300,833	3,377,434
4	Germany	3,494,900	0.8%	28.1%	71.1%	27,959	982,067	2,484,874
5	United Kingdom	2,649,890	0.7%	21%	78.3%	18,549	556,477	2,074,864

Are there alternative approaches that you would recommend that we take to measure technology adoption and use by U.S. companies?

- Measures to consider, committee input…..
  - ROI measurement, based on technology investment what is the ROI improvement?
  - R&D spending and related ROI
  - How do you differentiate improvements made by technology adoption vs. professional development of employees. Often, successful companies invest in both.
  - Number of employees vs productivity
  - Price point for set fee services….if its decreasing for the same service does that indicate technology investment?